JAPAN WANTS U.S. OKAY TO SEND TAINTED FUEL BACK TO U.K.; STUDY OUTLINES FUTURE MOX USE

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The Japanese government is seeking U.S. approval to return tainted mixed-oxide (MOX) fuel to the U.K. where it had been produced in a small pilot facility. The U.S. approval is being sought because the plutonium in the MOX arose from U.S.-origin uranium. The MOX is unlikely to be shipped until at least next spring.

Under the terms of the U.S.-Japan nuclear cooperation agreement, the return of the MOX fuel will require a "subsequent arrangement." The agreement provides programmatic consent for shipment of Japanese spent fuel to Europe for reprocessing—as well as for fabrication into MOX and return to Japan in that form—but not for shipment of MOX from Japan. Chris Kessler, a State Department official who was involved in the negotiations on the U.S.-Japan agreement, said that nobody had considered the possibility of a situation in which Japan would be returning unused material. Kessler reported that Japan had submitted the request for a subsequent arrangement earlier this month.

Separately, the British public received details about the contracting future market for MOX in Europe as it is consulted on whether the U.K. government should give a go-ahead to full operation of the commercial-scale Sellafield MOX Plant. The government wants to be certain SMP's operation is economically justified. Comments need to be submitted by Aug. 24.

A report by consultant Arthur D. Little Ltd. (ADL) is being used as the basis for the consultation. Although it describes how European countries have been moving away from recycling spent fuel to storage and ultimate disposal, it underscores European utilities' desire to keep recycling plutonium that is already separated, or shortly to be separated, under "baseload" reprocessing contracts with France's Cogema and BNFL.

In Switzerland, for example, political opposition to reprocessing has grown and a law could come before parliament next year to limit its future application, said ADL. Yet the country is still committed to MOX use to mop up the plutonium from its baseload contracts. Sweden operates an interim spent fuel storage facility, yet Swedish utility OKG is committed to converting baseload reprocessed spent fuel to MOX at BNFL's SMP. Germany is committed to direct final storage from July 1, 2005, yet, in the meantime, is still shipping spent fuel out to France and the U.K. which will result in more MOX fabrication.

ADL's analysis shows there are no real economic alternatives for European utilities to deal with their plutonium until sufficient spent fuel storage capacity has been created. Indeed, says ADL, utilities are still "generally encouraged" by various national and regulatory policies to recycle baseload-produced plutonium into MOX.

A "benchmark" used by ADL to illustrate demand for MOX fabrication is a December 1999 report showing that the Belgian Dessel MOX fabrication facility had its capacity fully booked until 2005 with German, Japanese, Swiss and Belgian contracts. As of Jan. 1, 2000, 418 tons of MOX fuel had been fabricated there since 1986.

Belgonucleaire, which owns the 35 metric tons of heavy metal per year (MTHM/yr) Dessel plant, wanted to extend the facility by adding two new production lines with a capacity of 60 MTHM/yr, said ADL. "However, it is now widely believed that the Dessel plant will be closed by 2010."

Dessel is operated in tandem with Cogema's Cadarache (40 MTHM/yr) and Melox (100 MTHM/yr) MOX plants in a so-called Cogema Group MOX Platform of the three plants, whose production is marketed by joint venture Commox, noted ADL. Belgonucleaire also markets MOX separately from Cogema.

Although Cogema wants to close its older Cadarache facility and extend the Melox capacity to 195-200 MTHM/yr, said ADL, the French coalition government's Green Party ministers "would be likely to be ill-disposed toward the Melox extension." The Green Party currently views MOX extension as a reason that would cause it to quit the Socialist-led coalition (NF, 30 April, 7).

ADL reported independent interviews with customers representing 95% of SMP's "target volumes" and said "all strongly expressed their intent...for MOX fuel."

It concluded that the U.K. could derive an overall financial benefit of 216-million pounds (U.S.$308-million) from letting BNFL operate SMP until 2012. To cancel SMP would mean a loss of 58-million pounds ($83-million), said ADL, indicating that it would be cheaper to give SMP the go-ahead. ADL treated the roughly 470-million pounds ($670-million) spent on constructing the facility as a "sunk" cost that did not need to be factored into the equation.

ADL was commissioned by the U.K. government in April to evaluate SMP's economic case, given that the uncertainty about the future MOX market has been exacerbated over the past couple of years by the 1999 MOX quality control (QC) data falsification scandal.

The resulting Japanese public outcry when the eight MOX fuel assemblies Japan's Kansai Electric Power Co. is now anxious to return, were found to have faulty QC data, reverberated around the world.

Utilities in Germany, Sweden and Switzerland temporarily suspended some of their business with BNFL. Germany's Preussen-Elektra AG had to pull four QC-affected MOX assemblies from its Unterweser PWR. But since then, European confidence in BNFL has slowly returned.

However, ADL's economic case for SMP depends on Thorp's baseload contracts with Japanese customers as well as those in Germany, Switzerland and Sweden. The Japanese also have contracts with BNFL's B205 magnox reprocessing plant.

Five Conditions

As a result of the MOX QC data falsifications, Japan's MOX loading program is delayed until at least next year, noted ADL. If loading of Belgonucleaire's MOX fuel gets started in Japan in spring 2002, it said, and BNFL is able to meet the "five conditions" imposed by the Japanese, then

BNFL MOX fuel could start being delivered to Japan in late 2004/early 2005.

This is approximately 18 months later than BNFL anticipated, said ADL. It bases its reasons, it said, "on a combination of customers' views and the outcome of the recent Kariwa village referendum" in Japan's Niigata prefecture, in which almost 54% of voters were against plans to load Belgonucleaire-fabricated MOX fuel in Tokyo Electric Power Co.'s Kashiwazaki-Kariwa-3.

ADL believes that by the time SMP's MOX deliveries start being made to Japan, "there will be pressure to step up MOX supply so the publicly announced (Japanese) target of loading 16 to 18 reactors using MOX by 2010 can be met."

ADL said Japan's own MOX fuel fabrication plant, the planned 100 MTHM/yr-plus Rokkasho-mura facility, is not expected to begin operation until at least 2008/09 and "industry consensus is there are likely to be delays to this schedule."

The five conditions imposed on BNFL by the Japanese basically cover U.K. government approval of SMP, satisfactory quality assurance and quality control reforms, sufficient restoration of public confidence in BNFL in Japan, assurance that SMP's MOX will pass inspections by Japanese regulators, and the return of the Kansai fuel to the U.K.—the latter being "the most visible indication of progress," said ADL.

BNFL agreed to Kansai's demands in July 2000 to take back the MOX, which was delivered to Japan for Kansai's Takahama-4 at the start of October 1999. Shortly thereafter, BNFL was forced to admit the QC falsifications. The fuel has been kept in a cooling pond at the Takahama site.

In BNFL's settlement with Kansai, the company agreed to bear the costs of the MOX fuel's return and to pay compensation of 40-million pounds ($57-million). Half was payable immediately in cash, with much of the rest agreed to be paid "in kind" by BNFL's provision of replacement MOX. If Kansai decided it did not want a replacement supply, both sides agreed the rest could be paid "in cash at a suitable later date."

This month's Japanese request for U.S. consent is the first of a number of intergovernment approvals and other organizational issues that have to be carried out before the transport can begin. ADL believes the return of the fuel will occur sometime between spring 2002 and mid-2003. BNFL said the transport costs are expected to amount to "several million pounds."—*Pearl Marshall, London*